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THE SMALL MAMMALS OF THE CUYAHOGA VALLEY NATIONAL RECREATION AREA

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INTRODUCTION

The purpose of this paper is to describe the occurrence, distribution, and population characteristics of small mammals of the Cuyahoga Valley National Recreation Area (CVNRA) in northeast Ohio.

The small mammals of the Cuyahoga Valley have been studied by only a few researchers in the past fifty years (Bole and Moulthrope, 1942; Thomas, 1951; Hanson, 1974; Ohio Department of Natural Resources, 1974). These studies have been species inventories using data from existing museum collections. Only one recent report has included additional field observation and collection (Ohio Department of Natural Resources, 1974).

MATERIALS AND METHODS

I set traplines of large and small snap traps and Sherman traps at five stations between July 13 and August 10, 1977. A trapline was set out on the first morning, checked on the second and third mornings and removed on the third morning. Peanuts or an oatmeal-peanut butter mixture were used for bait. I recorded standard body measurements, weight, molt, body fat and reproductive condition for each specimen. All skulls and most stomachs were preserved. Several study skins of each species were prepared.

These study skins and the skulls remain in the mammal collection of the University of Akron.

The specimens of Peromyscus leucopus were assigned relative ages based upon the amount of tooth wear. Each skull was compared to a standard series of skulls representing ten classes of tooth wear and given an age from one (youngest- least tooth wear) to ten (oldest- most tooth wear). Although this method has limited usefulness, it provides more accurate information on ages than weight, molt or body measurements (Sheppe, 1972). The relative age of Blarina brevicauda can be determined from the degree of fusion of the cranial sutures. However, because of the partial destruction of many of the skulls by the snap traps, this method could not be used. Too few specimens of other species were collected to allow useful age grouping.

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The reproductive condition of females was recorded as: (1) never bred- vagina imperforate; (2) breeding- visible embryos in the uterus; (3) parous- placental scars or teats present. Males with visible tubules in the epididymides were considered to be in breeding condition.

Contents from the preserved stomachs were washed with 1.0 N. HCL and rinsed with distilled water. The remaining material was diluted with 5-10ml of distilled water. Several drops of this mixture were randomly selected and placed under a microscope at 40X. Each slide was qualitatively examined for the percentage of seeds, vegetable matter, animal matter, and unknown matter present.

Differences between means were tested with the t-test at the 0.05 level of significance. Differences in proportions were tested by the Chi-square at the 0.05 level of significance (Armstrong, 1973). Mean values given in the tables are followed by their standard deviations.

THE TRAPPING STATIONS

Five stations, all on National Park Service lands, were trapped. The stations sampled the major habitats within the Cuyahoga Valley.

Station 1: ($41^{\circ} 12' 30''$ N, $81^{\circ} 35' 00''$ W)

The Oak Hill Environmental Center, located north of Everett Road and east of Oak Hill Road. This area contains land along the steep valley walls and the level land on the valley rim. Second growth evergreen and deciduous forest cover the area.

Station 2: ($41^{\circ} 10' 45''$ N, $81^{\circ} 33' 45''$ W)

Land to the east and west of Steel's Corner^{ED} Road, one kilometer north of Akron-Peninsula Road. The area is gently rolling abandon^{ED} pasture surrounded by a second-growth deciduous forest.

Station 3: ($41^{\circ} 11' 00''$ N, $81^{\circ} 34' 45''$ W)

Land along the natural levee on the west bank of the Cuyahoga River, just north of Ira Road. Tall grasses and shrubs are the dominant vegetation.

Station 4: ($41^{\circ} 12' 45''$ N, $81^{\circ} 34' 00''$ W)

Land west of Riverview Road, one kilometer north of Everett Road. This area is the western edge of the floodplain of the Cuyahoga River. It has been recently disturbed by man and is covered with low grasses and brambles.

Station 5: ($41^{\circ} 13' 00''$ N, $81^{\circ} 35' 00''$ W)

Land east and west of Oak Hill Road, one kilometer south of Major Road. This gently rolling upland area is covered mostly with short grasses. A pine nursery and a man-made lake occupy the eastern portion of the station.

FIGURE 1 TRAPPING STATIONS

PENINSULA, OHIO

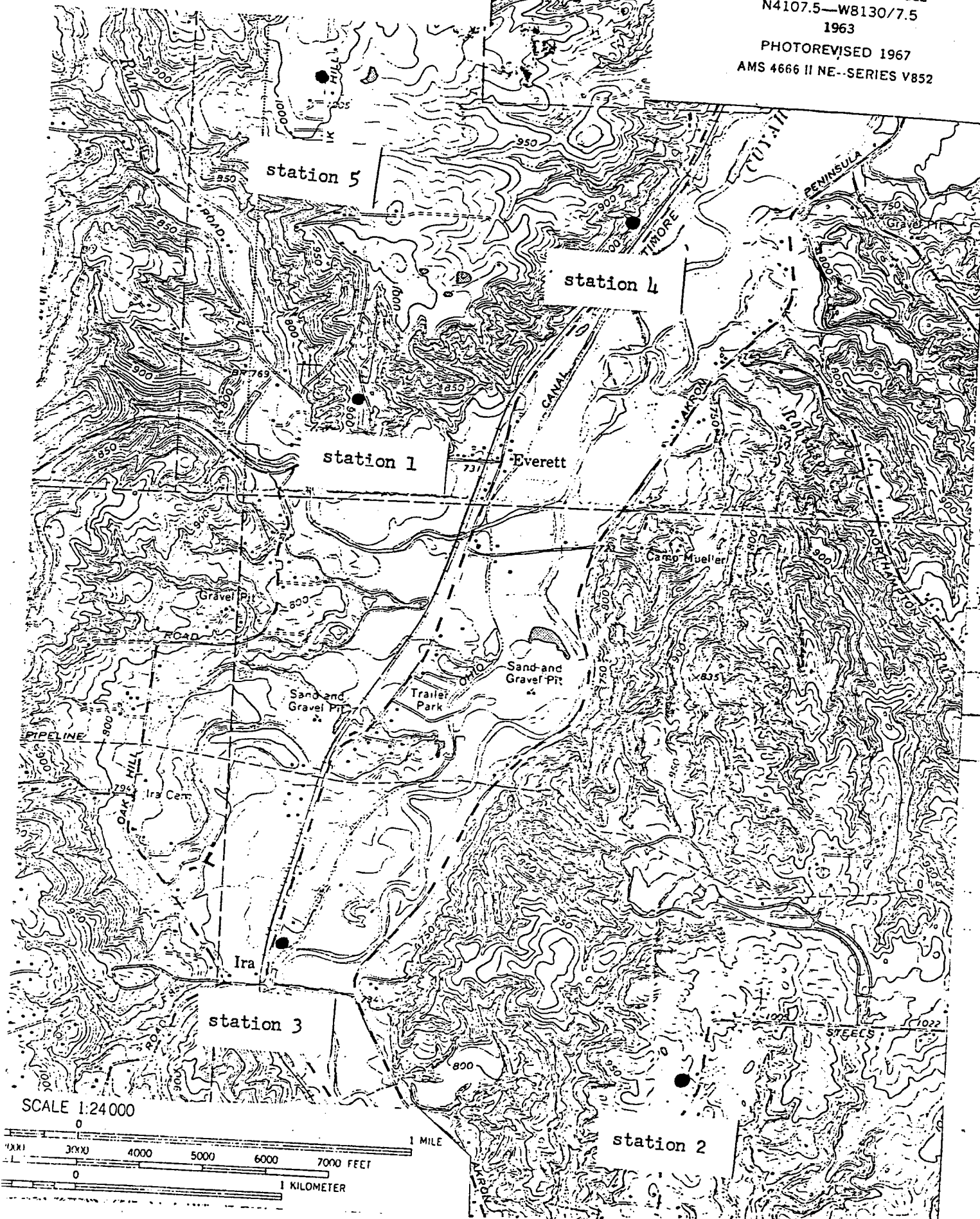
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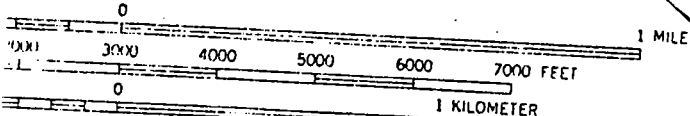
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station 2

RESULTS AND DISCUSSION

One hundred and two animals of four species (Peromyscus leucopus-54 collected; Blarina brevicauda --20 collected; Microtus Pennsylvanicus--20 collected; Tamias striatus--1 collected) were captured in 1380 trap-nights. The success rate was 7%. Each of these species is discussed in depth below.

Other mammals observed during this study included white-tailed deer, groundhogs and unidentified moles. A large number of other mammals are known or expected to occur in this region (Ohio Department of Natural Resources, 1974; Burt and Grossenheider, 1976). Although only four species were collected in this study, other studies have not collected many more. The Ohio Department of Natural Resources study (1974) collected only 8 species and only Peromyscus leucopus and Blarina brevicauda in large numbers.

Peromyscus leucopus

The white-footed mouse was the most frequently collected animal. A total of 54 were captured at all of the trapping stations. All were found in woody or brushy habitats,

A closely related species, P. maniculatus, is sometimes misidentified as P. leucopus (Burt and Grossenheider, 1976). In this region, P. maniculatus has a shorter tail (compared to total body length) than P. leucopus. Figure 2 shows that none of the Peromyscus collected have significantly shorter tails and all are P. leucopus.

FIGURE 2: BODY LENGTH vs. TAIL LENGTH in PEROMYSCUS LEUCOPUS

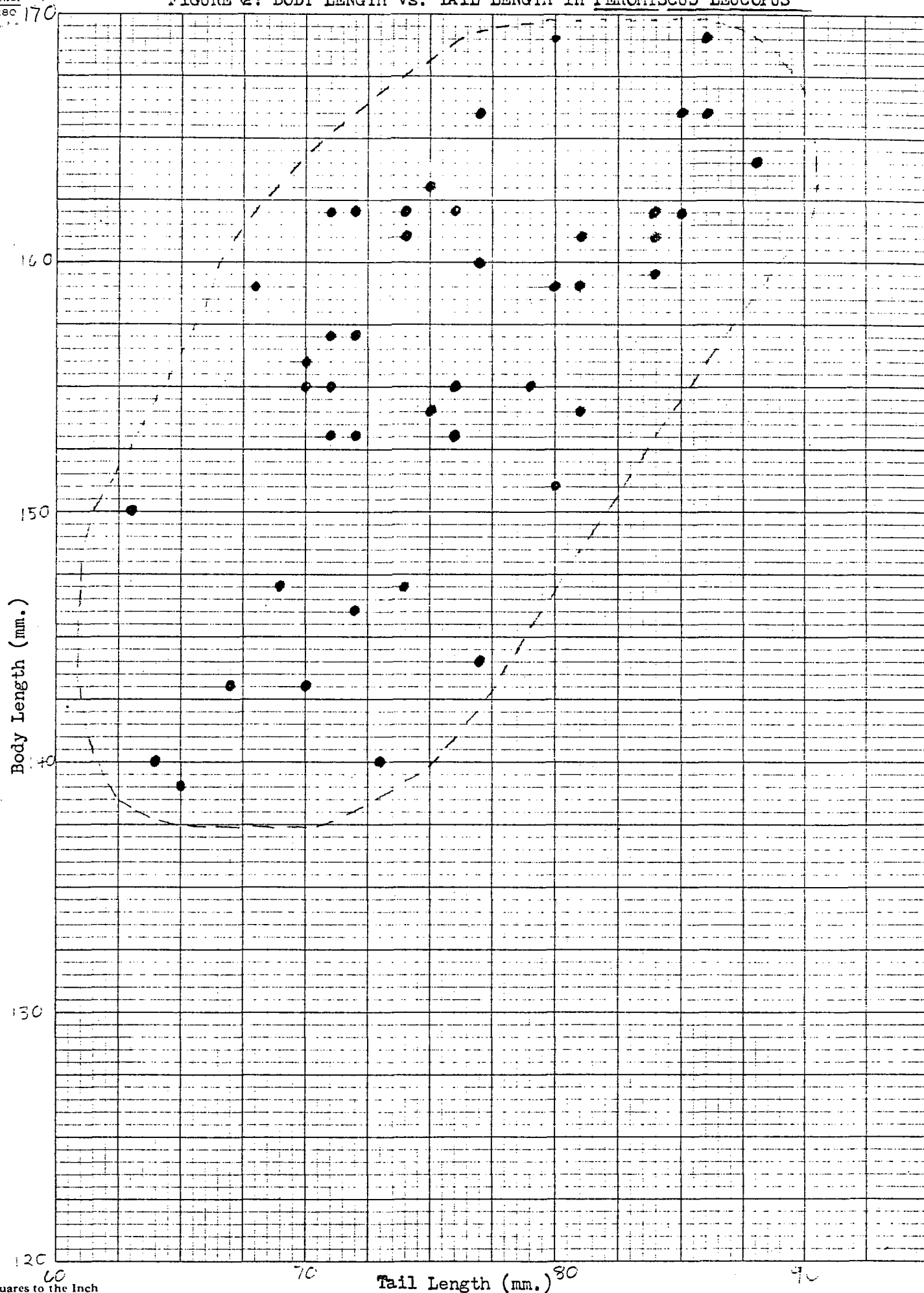


Table 1. Total ~~body~~ length and weight of Peromyscus leucopus

Station	n*	Mean length (mm)	s.d.	Mean weight (g)	s.d.
1	22	154.4	8.54	17.57	2.19
2	6	150.2	6.82	14.65	2.77
3	11	151.2	7.89	16.72	2.59
4	2	161.5	0.50	20.45	1.35
5	6	167.0	4.69	19.22	2.17

* damaged specimens are not included.

No significant differences in body weight or body length seems to occur between the populations at the five stations.

Table 2. Age structure in Peromyscus leucopus

Station	Tooth wear class			
	1-2	3-5 (No. of skulls)	6-8	9-10
1	0	9	10	3
2	1	2	2	1
3	0	6	5	0
4	0	1	1	0
5	0	2	2	2
Total	1	20	20	6

A similar age structure is found at all the stations. About equal

percentages are found in age classes 3-5 and 6-8 (89% are in the middle age range of 3-8). Few very young or very old animals^s were collected.

Table 3. Sex ratio in Peromyscus leucopus

Sex	No. per station					Total
	1	2	3	4	5	
Female	10	4	5	1	4	24
Male	14	2	6	1	2	25

No significant difference from the expected equal ratio of female to male was found.

Table 4. Sex differences in Peromyscus leucopus

	Total length (mm)	s.d.	weight (g)	s.d.	tooth wear class (%)			
					1-2	3-5	6-8	9-10
Female	154.0	9.03	16.67	2.82	5	36	54	5
Male	157.3	7.30	17.97	2.35	0	42	38	20

No differences due to sex were detected in the total length or weight of the collected animals. The females were mostly in the middle age class (3-8) as were the males, With more females than males in the 6-8 class but fewer in the old age class (9-10). The significance of this is not known.

In general, Males were more frequently found to be in breeding condition than females (35% to 12%). Breeding condition varied from station to

station, but no one station contained a significantly greater number of breeding individuals than the others. Only one pregnant female was found (at station 5).

Table 5. Stomach content of Peromyscus leuconus

n	seeds	vegetation	animal	unidentified
29	2%	38%	2%	58%

A large part of the diet of Peromyscus is vegetable matter. Very little is animal matter.

Blarina brevicauda

Short-tailed shrews (27 specimens) were collected at all of the trapping stations in all types of habitat.

Table 6. Total body length and weight of Blarina brevicauda

Station	n	Mean length (mm)	s.d.	Mean weight (g)	s.d.
1	4	113.8	4.27	17.6	1.84
2	14	119.5	10.53	17.5	2.82
3	1	110.0	0.00	15.9	0.00
4	3	114.3	5.86	16.6	0.30
5	5	121.6	6.50	18.4	1.89

No significant differences in total length or weight could be detected between trapping stations.

The sex ratio was: females 8; males 17. These values seem to be significantly different from expected equal numbers of males to females. The unusual sex ratio may be significant or may be a sampling error due to the small sample size.

There was no difference in total length or weight between the sexes.

Only one Blarina was collected in breeding condition (a female at station 5). However, because shrews are sometimes difficult to sex, it is also difficult to accurately determine the breeding condition of the animals.

An analysis of the stomach contents of ten of the shrews revealed a large part of the diet to be vegetation (38%). Seven percent was animal matter and 55% was not identified

Microtus Pennsylvanicus

Twenty meadow voles were collected from all trapping stations except number one. All animals were collected in short and tall grass fields, none in wooded or shrubby areas. No differences in body length or weight could be found between the trapping stations. The sex ratio was not significantly different (females: 5; males: 14). Sexual differences in total length or weight were also not significant. Two pregnant females were collected at station five. Overall, 57% of the males and 40% of the females were in breeding condition. Although few Microtus were collected, many were in breeding condition.

The analysis of stomach contents showed 76% of the diet consisted of vegetation and less than 1% was seeds or animal matter.

Tamias striatus

One chipmunk was collected (at station one). It was a nonbreeding female 224 mm in length and weighing 80.0 g.

CONCLUSIONS

Only four of the more than twenty mammals probably occurring in the Cuyahoga Valley were collected in this study. This is due to the types of traps used, the general kinds of baits used and the fact that some species rarely enter traps. Few total individuals were collected and the success rate was only 7%. This is not unusual because of the extreme changes in numbers that small mammal populations undergo.

In general, the results of this project agree with the information previously found for the distribution and analysis of small mammals in the Cuyahoga Valley.

ACKNOWLEDGMENTS

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